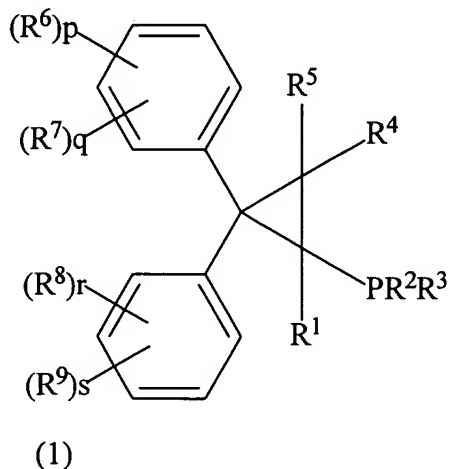


AMENDMENTS TO THE CLAIMS

1. (Original) A phosphine compound of formula (1),

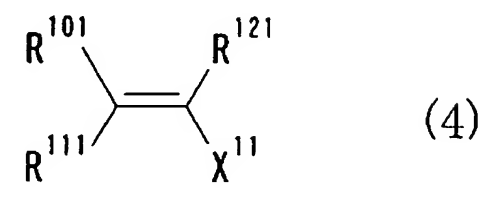
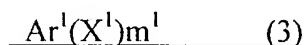


wherein R^1 is a hydrogen atom, an alkyl group, a cycloalkyl group or a phenyl group which may be substituted; R^2 and R^3 are each, the same or different, an alkyl group, a cycloalkyl group or a phenyl group which may be substituted; R^4 and R^5 are each, the same or different, a hydrogen atom, an alkyl group, a cycloalkyl group or a phenyl group which may be substituted; R^6 , R^7 , R^8 and R^9 are each, the same or different, an alkyl group, a cycloalkyl group, a phenyl group which may be substituted, an alkoxyl group, a dialkylamino group, a halogen atom, a benzyl group, a naphthyl group or a halogenated alkyl group; R^6 and R^7 , or R^8 and R^9 each may be combined to form, a fused ring, a trimethylene group, a tetramethylene group or a methylenedioxy group; p , q , r and s are each an integer of from 0 to 5; and $p + q$, and $r + s$ are each in the range of from 0 to 5.

2. (Original) A palladium-phosphine complex which can be obtained by reacting the phosphine compound of claim 1 with a palladium compound.

3. (Original) The palladium-phosphine complex of claim 2, wherein the palladium compound is a palladium salt or a palladium complex in which the valency of palladium is 4, 2 or 0.

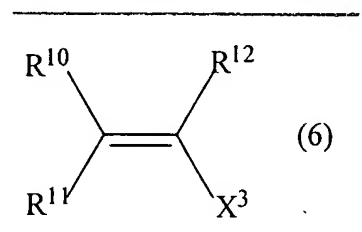
4. (Currently amended) A method of manufacturing method of an unsaturated compound or an aromatic compound which comprises reacting a compound of formula (3) or (4) below:



wherein, in formula (3), Ar¹ is an aryl group which may be substituted or a heteroaryl group which may be substituted; X¹ is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group and m¹ is an integer of 1 to 4, and,

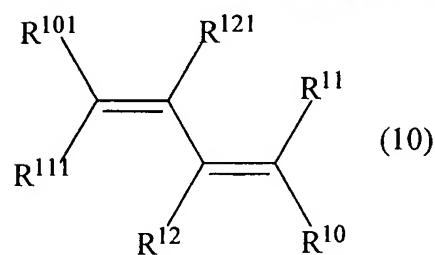
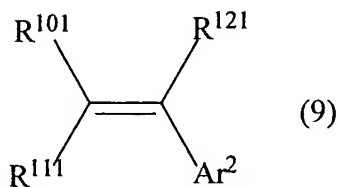
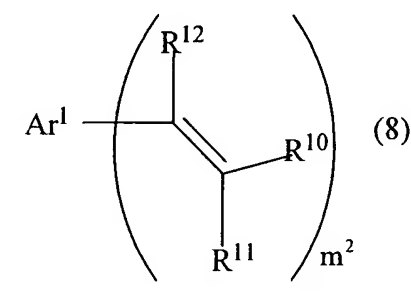
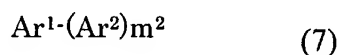
in formula (4), R¹⁰¹, R¹¹¹ and R¹²¹ are each, the same or different, a hydrogen atom, an alkyl group, an aryl group which may be substituted, a heteroaryl group which may be substituted, an alkoxy carbonyl group or a cyano group; X¹¹ is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group,

with a compound, of formula (5) or (6) below,



wherein, in formula (5), Ar² is an aryl group which may be substituted or a heteroaryl group which may be substituted; X² is B(OR¹³)(OR¹⁴), Sn(R¹⁵)₃, MgX, ZnX, Al(R¹⁵)₂ or Li, and,

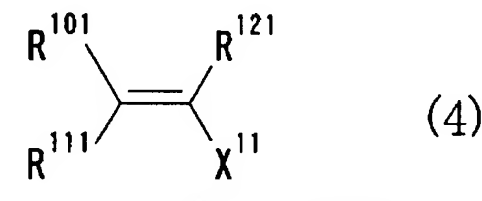
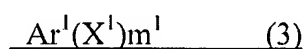
in formula (6), R^{10} , R^{11} and R^{12} are each, the same or different, a hydrogen atom, an alkyl group, an aryl group which may be substituted, a heteroaryl group which may be substituted, an alkoxy carbonyl group or a cyano group; R^{10} and R^{12} may be combined to form a single bond, forming together with the existing double bond a triple bond; X^3 is a hydrogen atom, $B(OR^{13})(OR^{14})$, $Sn(R^{15})_3$, MgX , ZnX , $Al(R^{15})_2$ or Li ; R^{13} and R^{14} are each, the same or different, a hydrogen atom, an alkyl group, or, combined to form an ethylene group or a 1,2-dimethylethylene group; R^{15} is an alkyl group, and X is a chlorine atom, a bromine atom or an iodine atom, to give a compound of formula (7), (8), (9) or (10).



wherein Ar^1 , Ar^2 , R^{10} , R^{11} , R^{12} , R^{101} , R^{111} and R^{121} are as defined above and m^2 is an integer of 1 to 4, and

wherein the reaction is conducted in the presence of the ~~by the use of palladium-phosphine complexes~~ complex of mentioned in claim 2 as a catalyst.

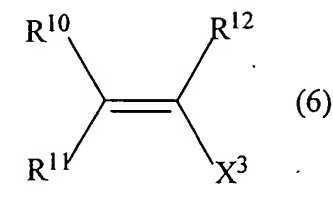
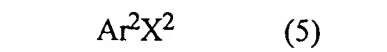
5. (Currently amended) A method of manufacturing method of an unsaturated compound or an aromatic compound which comprises reacting a compound of formula (3) or (4) below:



wherein, in formula (3), Ar^1 is an aryl group which may be substituted or a heteroaryl group which may be substituted; X^1 is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group and m^1 is an integer of 1 to 4, and,

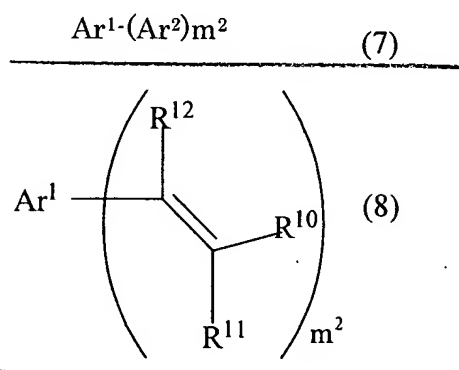
in formula (4), R^{101} , R^{111} and R^{121} are each, the same or different, a hydrogen atom, an alkyl group, an aryl group which may be substituted, a heteroaryl group which may be substituted, an alkoxycarbonyl group or a cyano group; X^{11} is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group.

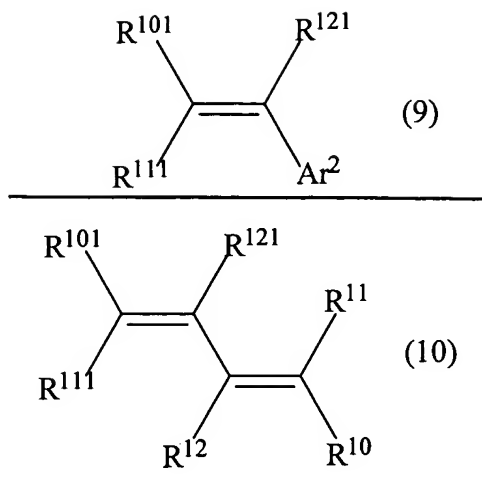
with a compound, of formula (5) or (6) below,



wherein, in formula (5), Ar^2 is an aryl group which may be substituted or a heteroaryl group which may be substituted; X^2 is $\text{B}(\text{OR}^{13})(\text{OR}^{14})$, $\text{Sn}(\text{R}^{15})_3$, MgX , ZnX , $\text{Al}(\text{R}^{15})_2$ or Li , and,

in formula (6), R^{10} , R^{11} and R^{12} are each, the same or different, a hydrogen atom, an alkyl group, an aryl group which may be substituted, a heteroaryl group which may be substituted, an alkoxy carbonyl group or a cyano group; R^{10} and R^{12} may be combined to form a single bond, forming together with the existing double bond a triple bond; X^3 is a hydrogen atom, $\text{B}(\text{OR}^{13})(\text{OR}^{14})$, $\text{Sn}(\text{R}^{15})_3$, MgX , ZnX , $\text{Al}(\text{R}^{15})_2$ or Li ; R^{13} and R^{14} are each, the same or different, a hydrogen atom, an alkyl group, or, combined to form an ethylene group or a 1,2-dimethylethylene group; R^{15} is an alkyl group, and X is a chlorine atom, a bromine atom or an iodine atom, to give a compound of formula (7), (8), (9) or (10),



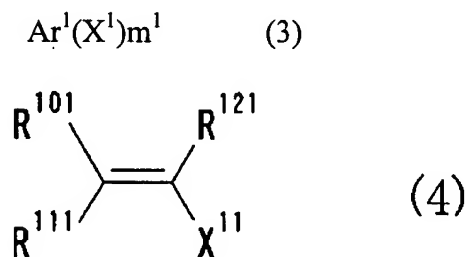


wherein Ar^1 , Ar^2 , R^{10} , R^{11} , R^{12} , R^{101} , R^{111} and R^{121} are as defined above and m^2 is an integer of 1 to 4, and

wherein the reaction is conducted in the presence of ~~by the use of~~ the phosphine compound ~~mentioned in~~ claim 1 and a palladium compound as catalysts.

6. (Cancelled)

7. (Currently amended) A method of manufacturing an unsaturated compound or an aromatic compound ~~method of claim 4;~~ which comprises reacting a compound of formula (3) or (4) below,



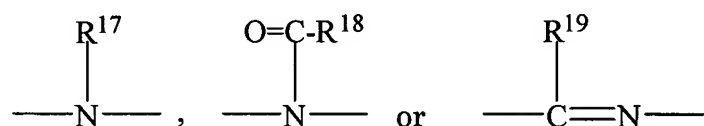
wherein, in formula (3), Ar^1 is an aryl group which may be substituted or a heteroaryl group which may be substituted; X^1 is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group and m^1 is an integer of from 1 to 4, and,

in formula (4), R^{101} , R^{111} and R^{121} are each, the same or different, a hydrogen atom, an alkyl group, an aryl group which may be substituted, a heteroaryl group which may be substituted, an alkoxy carbonyl group or a cyano group; X^{11} is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group,

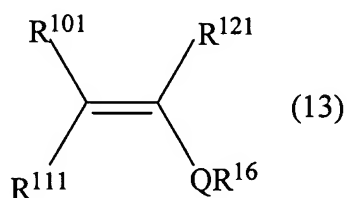
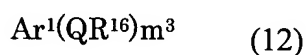
with an oxygen compound or a nitrogen compound of formula (11) below,



wherein R^{16} is an alkyl group, an aryl group which may be substituted or a heteroaryl group which may be substituted; Q is an oxygen atom,



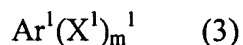
wherein R^{17} , R^{18} and R^{19} are each a hydrogen atom, an alkyl group, an aryl group which may be substituted or a heteroaryl group which may be substituted; and R^{16} and R^{17} may be combined to form a divalent aromatic ring which may be substituted, to give a compound of formula (12) or (13) below,



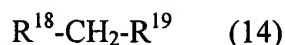
wherein Ar^1 , Q, R^{16} , R^{101} , R^{111} and R^{121} are as defined above and m^3 is an integer of 1 to 4, and

wherein the reaction is conducted in the presence of the palladium-phosphine complex of claim 2 as a catalyst.

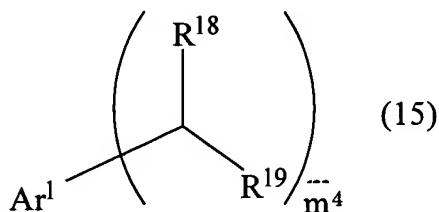
8. (Currently amended) ~~The~~ A method of manufacturing an unsaturated compound or an aromatic compound ~~method of claim 4,~~ which comprises reacting an aromatic compound of formula (3),



wherein Ar^1 is an aryl group which may be substituted or a heteroaryl group which may be substituted; X^1 is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group, and m^1 is an integer of from 1 to 4, with a carbonyl compound or a cyano compound of formula (14),

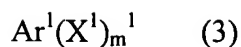


wherein R^{18} is a hydrogen atom, CO_2R^{20} , C(=O)R^{21} or a cyano group; R^{19} is CO_2R^{22} , C(=O)R^{23} or a cyano group; R^{20} , R^{21} , R^{22} and R^{23} are each an alkyl group, an aryl group which may be substituted or a heteroaryl group which may be substituted, to give a compound of formula (15),



wherein Ar^1 , R^{18} and R^{19} are as defined above and m^4 is an integer of 1 to 4, and wherein the reaction is conducted in the presence of the palladium-phosphine complex of claim 2 as a catalyst.

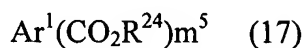
9. (Currently amended) ~~The~~ A method of manufacturing an unsaturated compound or an aromatic compound ~~method of claim 4,~~ which comprises reacting an aromatic compound of formula (3),



wherein Ar^1 is an aryl group which may be substituted or a heteroaryl group which may be substituted; X^1 is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group; and m^1 is an integer of from 1 to 4, with carbon monoxide and an alcohol of formula (16),



wherein R^{24} is an alkyl group,
to give a carboxylic ester of formula (17),

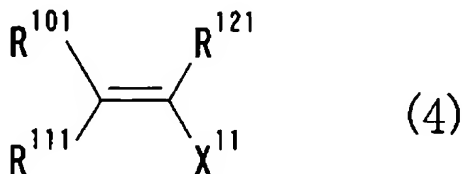
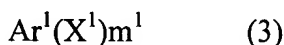


wherein Ar^1 and R^{24} are as defined above and m^5 is an integer of 1 to 4, and
wherein the reaction is conducted in the presence of the palladium-phosphine
complex of claim 2 as a catalyst.

10. (Currently amended) The method of manufacturing an ~~method of~~ unsaturated compounds~~compound~~, as ~~elaimed~~ in claim 4, which comprises carrying out the reaction in the presence of a base.

11. (Cancelled)

12. (New) A method of manufacturing an unsaturated compound or an aromatic compound which comprises reacting a compound of formula (3) or (4) below,



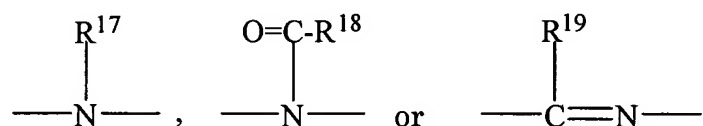
wherein, in formula (3), Ar¹ is an aryl group which may be substituted or a heteroaryl group which may be substituted; X¹ is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group and m¹ is an integer of from 1 to 4, and,

in formula (4), R¹⁰¹, R¹¹¹ and R¹²¹ are each, the same or different, a hydrogen atom, an alkyl group, an aryl group which may be substituted, a heteroaryl group which may be substituted, an alkoxycarbonyl group or a cyano group; X¹¹ is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group,

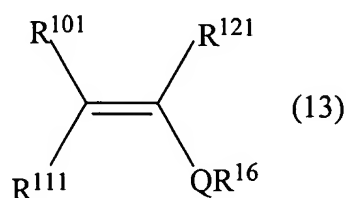
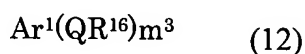
with an oxygen compound or a nitrogen compound of formula (11) below,



wherein R¹⁶ is an alkyl group, an aryl group which may be substituted or a heteroaryl group which may be substituted; Q is an oxygen atom,



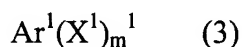
wherein R¹⁷, R¹⁸ and R¹⁹ are each a hydrogen atom, an alkyl group, an aryl group which may be substituted or a heteroaryl group which may be substituted; and R¹⁶ and R¹⁷ may be combined to form a divalent aromatic ring which may be substituted, to give a compound of formula (12) or (13) below,



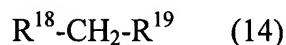
wherein Ar^1 , Q , R^{16} , R^{101} , R^{111} and R^{121} are as defined above and m^3 is an integer of 1 to 4, and

wherein the reaction is conducted in the presence of the phosphine compound of claim 1 and a palladium compound as catalysts.

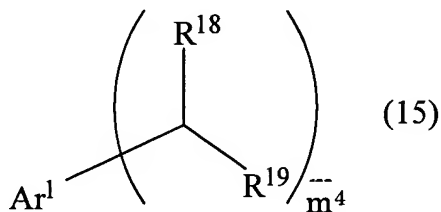
13. (New) A method of manufacturing an unsaturated compound or an aromatic compound which comprises reacting an aromatic compound of formula (3),



wherein Ar^1 is an aryl group which may be substituted or a heteroaryl group which may be substituted; X^1 is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group, and m^1 is an integer of from 1 to 4, with a carbonyl compound or a cyano compound of formula (14),



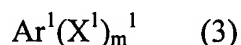
wherein R^{18} is a hydrogen atom, CO_2R^{20} , $\text{C}(=\text{O})\text{R}^{21}$ or a cyano group; R^{19} is CO_2R^{22} , $\text{C}(=\text{O})\text{R}^{23}$ or a cyano group; R^{20} , R^{21} , R^{22} and R^{23} are each an alkyl group, an aryl group which may be substituted or a heteroaryl group which may be substituted, to give a compound of formula (15),



wherein Ar^1 , R^{18} and R^{19} are as defined above and m^4 is an integer of 1 to 4, and

wherein the reaction is conducted in the presence of the phosphine compound of claim 1 and a palladium compound as catalysts.

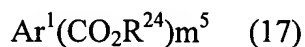
14. (New) A method of manufacturing an unsaturated compound or an aromatic compound which comprises reacting an aromatic compound of formula (3),



wherein Ar^1 is an aryl group which may be substituted or a heteroaryl group which may be substituted; X^1 is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group; and m^1 is an integer of from 1 to 4, with carbon monoxide and an alcohol of formula (16),



wherein R^{24} is an alkyl group,
to give a carboxylic ester of formula (17),



wherein Ar^1 and R^{24} are as defined above and m^5 is an integer of 1 to 4, and

wherein the reaction is conducted in the presence of the phosphine compound of claim 1 and a palladium compound as catalysts.